Rec'd PCT/PTO 01 JUL 2004

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOK, ACTION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau





(43) International Publication Date 21 May 2004 (21.05.2004)

PCT

(10) International Publication Number WO 2004/041406 A1

(51) International Patent Classification⁷: 33/00, B07B 1/46, 1/48

B01D 29/01,

(21) International Application Number:

PCT/GB2003/004531

(22) International Filing Date: 20 October 2003 (20.10.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 0225619.6

2 November 2002 (02.11.2002)

- (71) Applicant (for all designated States except US): UNITED WIRE LTD [GB/GB]; Granton Park Avenue, Edinburgh EH5 1HT (GB).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): ROBERTSON, Graham, Alexander [GB/GB]; 52 Rannoch Road, Edinburgh EH4 7EN (GB).

- (74) Agent: KEITH W NASH & Co; 90-92 Regent Street, Cambridge CB2 1DP (GB).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: WOVEN WIRE CLOTH SCREEN

(57) Abstract: A woven wire cloth screen is described in which at least one fine mesh cloth overlies a coarser mesh backing cloth and an additional coarser mesh cloth is secured over the fine mesh cloth, whose mesh and wire size at least are selected so as in general to prevent relatively large abrasive particles from making contact with the fine mesh cloth. Two fine mesh cloths may be sandwiched between the coarser cloths. In one screen the backing cloth is 30# x 01.280mm diameter S/S wire, the upper fine mesh is 180# x 0.030mm diameter S/S wire, the lower fine mesh is 160# x 0.036mm diameter S/S wire, and the additional top cloth is 30# x 60# x 0.160mm diameter S/S wire. A method of making such a screen is described in which the cloths are in turn laid over a rigid frame to which they are to be bonded and the tension in the wire mesh cloths is achieved using pneumatically powered rams acting on clamps which grip the edges of the cloths. All the rams are of the same size and different tensions are imparted to the cloths by supplying air at differing pressures to the rams acting on the different cloths. In particular a method is described for making a woven wire cloth screen which will withstand highly abrasive large particles such as obtained when drilling through Utsira sand, in which a support frame is located in a jig, a coarse backing cloth is stretched over the frame -and secured between clamping jaws along all four edges and then tensioned by moving all the clamps relatively outwardly by pneumatic rams. A fine mesh wirecloth is then stretched over the first cloth and similarly tensioned by means of a second set of clamps and rams. An additional coarse mesh cloth is then similarly stretched over the fine mesh cloth and tensioned by means of a third set of clamps and rams. Thereafter the cloths are secured to the support frame under pressure. After releasing the pressure, opening the clamping jaws, and trimming surplus wirecloth back to the frame, the finished screen can be removed from the jig. A second fine mesh cloth can be laid over the first fine mesh cloth before the top coarse cloth is applied, and the two fine mesh cloths can be clamped using the same set of jaws and rams.

WO 2004/041406 A1

INTERNATIONAL CARCH REPORT

Intermenal Acation No PCT/GB 14531

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B01D29/01 B01D33/00

B07B1/46

B07B1/48

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols) IPC 7-B010-B07B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUM	ENTS CONSIDERED TO BE RELEVANT	
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Х	US 5 958 236 A (BAKULA JOHN J) 28 September 1999 (1999-09-28)	1,4,7, 11,12
Υ	column 9, lines 44-62; figures 1,6,22	2,3,17
X	US 6 454 099 B1 (GRICHAR CHARLES N ET AL) 24 September 2002 (2002-09-24)	1,4,7,
Υ	column 11, line 67 - column 12, line 5; figures 1A,13C	2,3,17
Χ .	US 5 221 008 A (DERRICK JR H WILLIAM ET AL) 22 June 1993 (1993-06-22)	1,4,7, 11,12
Υ	column 5, lines 3-29; figures 1,3	2,3,17
Y	GB 2 322 590 A (UNITED WIRE LTD) 2 September 1998 (1998-09-02) abstract	2,3,17
	page 6, line 16 - page 7, line 20; claims 28-30	

X Further documents are listed in the continuation of box C.	Patent family members are listed in annex.			
Special categories of cited documents: 'A' document defining the general state of the art which is not considered to be of particular relevance 'E' earlier document but published on or after the international filing date 'L' document which may throw doubts on priority ctaim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) 'O' document referring to an oral disclosure, use, exhibition or other means 'P' document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family			
Date of the actual completion of the international search 11 February 2004	Date of mailing of the international search report 17/02/2004			
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo ni, Fax: (+31-70) 340-3016	Authorized officer Hoffmann, A			

3



Intermenal	lication No	
PCT/GB	04531	

C.(Continu	ation) DOCUMENTS CONSIDERED TO BE RELEVANT	
Category °	Cliation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 169 698 A (THULE UNITED LTD) 29 January 1986 (1986-01-29) page 9, line 20 - page 12, line 6	2,3
Υ	GB 2 308 315 A (UNITED WIRE LTD) 25 June 1997 (1997-06-25) page 2, column 26 - page 3, column 7	2,3
A	WO 99/24144 A (ITS DRILLING SERVICES LTD ; MORRIS RONALD G (GB); RENNIE LYALL (GB)) 20 May 1999 (1999-05-20) page 3, lines 11-32	2,3
Α	US 5 927 511 A (BALTZER TERRY L ET AL) 27 July 1999 (1999-07-27) column 5, lines 57-67; figures 10,11	17
Α .	US 4 696 751 A (EIFLING DENNIS R) 29 September 1987 (1987-09-29) column 2, line 60 - column 3, line 27; figures 1,2	8,9
	,	
•		
		}
•		
		·
•		

3

INTERNATIONAL SEARCH REPORT

rm patent family members

	PCT/GB	
~11:	,	Bublication

				PC1/GB	04531
Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 5958236	Α	28-09-1999	US US	5783077 A 5417859 A	21-07-1998 23-05-1995
			US	5417858 A	23-05-1995
			US	6053332 A	25-04-2000
			US	6340089 B1	22-01-2002
			ÜS	2002033358 A1	21-03-2002
			ÜS	6000556 A	14-12-1999
			US	5876552 A	02-03-1999
			AU	690096 B2	23-04-1998
			UA	6084494 A	15-08-1994
			CA	2152602 A1	21-07-1994
			DE	69420701 D1	21-10-1999
			DE		. 02-03-2000
			DK	680385 T3	31-01-2000
			ΕP	0680385 A1	08-11-1995
			ES	2135563 T3	01-11-1999
		•	MO	9415723 A1	21-07-1994
			US	5417793 A	23-05-1995
			AU .	693086 B2	25-06-1998
			AU	6023194 A	15-08-1994
			ΑU	714591 B2	06-01-2000 09-07-1998
			AU CA	6593998 A 2152610 A1	21-07-1994
			DE	69421381 D1	02-12-1999
			DE	69421381 T2	06-04-2000
			DK	680386 T3	24-01-2000
			EP	0680386 A1	08-11-1995
			ES.	2137356 T3	16-12-1999
			WO	9415724 A1	21-07-1994
			US	5720881 A	24-02-1998
			US	5868929 A	09-02-1999
			US 	5944993 A	31-08-1999
US 6454099	B1	24-09-2002	US	6152307 A	28-11-2000
		,	US	6267247 B1	31-07-2001 23-11-1999
			US US	5988397 A 5971159 A	25-11-1999 26-10-1999
•			US	5971159 A 5385669 A	31-01-1995
			US	5392925 A	28-02-1995
,			US	5598930 A	04-02-1997
		•	US	5490598 A	13-02-1996
			ÜS	6565698 B1	20-05-2003
			ÜS	6283302 B1	04-09-2001
			ÜS	6401934 B1	11-06-2002
			AU	7433600 A	17-04-2001
			CA	2381726 A1	22-03-2001
			٠.,		
•			EP	1212130 A1	12-06-2002
			EP EP	1270058 A2	02-01-2003
			EP EP WO	1270058 A2 0119492 A1	02-01-2003 22-03-2001
			EP EP WO NO	1270058 A2 0119492 A1 20020854 A	02-01-2003 22-03-2001 08-05-2002
			EP EP WO NO US	1270058 A2 0119492 A1 20020854 A 6629610 B1	02-01-2003 22-03-2001 08-05-2002 07-10-2003
			EP EP WO NO US US	1270058 A2 0119492 A1 20020854 A 6629610 B1 6581781 B1	02-01-2003 22-03-2001 08-05-2002 07-10-2003 24-06-2003
			EP WO NO US US	1270058 A2 0119492 A1 20020854 A 6629610 B1 6581781 B1 2002000399 A1	02-01-2003 22-03-2001 08-05-2002 07-10-2003 24-06-2003 03-01-2002
			EP WO NO US US US	1270058 A2 0119492 A1 20020854 A 6629610 B1 6581781 B1 2002000399 A1 2002079251 A1	02-01-2003 22-03-2001 08-05-2002 07-10-2003 24-06-2003 03-01-2002 27-06-2002
			EP WO NO US US US AU	1270058 A2 0119492 A1 20020854 A 6629610 B1 6581781 B1 2002000399 A1 2002079251 A1 2303100 A	02-01-2003 22-03-2001 08-05-2002 07-10-2003 24-06-2003 03-01-2002 27-06-2002 01-08-2000
			EP WO NO US US US AU CA	1270058 A2 0119492 A1. 20020854 A 6629610 B1 6581781 B1 2002000399 A1 2002079251 A1 2303100 A 2359346 A1	02-01-2003 22-03-2001 08-05-2002 07-10-2003 24-06-2003 03-01-2002 27-06-2002 01-08-2000 20-07-2000
			EP WO NO US US US AU	1270058 A2 0119492 A1 20020854 A 6629610 B1 6581781 B1 2002000399 A1 2002079251 A1 2303100 A	02-01-2003 22-03-2001 08-05-2002 07-10-2003 24-06-2003 03-01-2002 27-06-2002 01-08-2000

INTERNATIONAL SEARCH REPORT

patent family members

Publication

Patent document cited in search report	Publication date		Patent family member(s)	Publication date
US 6454099 B1		NO US US US US US US US US US US US US US	20012900 A 2003038061 A1 6290068 B1 6325216 B1 6269953 B1 6443310 B1 6450345 B1 2002043485 A1 1159600 A 2349538 A1 0025943 A2 1128914 A2 20010776 A 6371302 B1 8447898 A 9903601 A1 -2341567 A ,B 995669 A 6302276 B1 257044 T 198168 T 1799397 A 2240693 A1 69703730 D1 1002588 A1	31-08-2001 27-02-2003 18-09-2001 04-12-2001 07-08-2001 03-09-2002 17-09-2002 18-04-2002 22-05-2000 11-05-2000 05-09-2001 05-04-2001 16-04-2002 10-02-1999 28-01-1999 22-03-2000 15-03-2000 15-03-2000 15-01-2001 28-08-1997 14-08-1997 25-01-2001 24-05-2000
US 5221008 A	22-06-1993	NONE		
GB 2322590 A	02-09-1998	GB AT AU AU BD DD DD DD DD DD DD DD DD DD DD DD DD	2337019 A ,B 256509 T 252949 T 237409 T 724886 B2 6304498 A 9807644 A 69813521 D1 69813521 T2 69819371 D1 69820683 D1 1205263 T3 963261 T3 1205261 A2 1205262 A2 1205263 A2 1205264 A2 1205265 A2 0963261 A1 2197462 T3 9837988 A1 1024200 A1 2001513020 T 994245 A 2002088531 A1 2002088747 A1 2002088747 A1 2002096470 A1 2002113043 A1 6675975 B1	10-11-1999 15-01-2004 15-11-2003 15-05-2003 05-10-2000 18-09-1998 22-02-2000 22-05-2003 24-12-2003 24-12-2003 29-01-2004 05-01-2004 02-06-2003 15-05-2002 15-05-2002 15-05-2002 15-05-2002 15-05-2002 15-12-1999 01-01-2004 03-09-1998 08-08-2003 28-08-2001 01-09-1999 11-07-2002 11-07-2002 25-07-2002 22-08-2002 13-01-2004

INTERNATIONAL SEARCH REPORT

patent family members

PCT/GB 4531

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
GB 2322590	Α		ZA ZA	9801678 A 9902852 A	27-08-1999 27-08-1999
EP 0169698	A .	29-01-1986	AU AU CA EP ES GB GB JP NO US ZA ES	573868 B2 4520185 A 1274189 A1 0169698 A2 296761 U 2161715 A ,B 2162091 A ,B 2175222 A ,B 2556678 B2 61038607 A 852856 A ,B, 4728422 A 8505410 A 8706467 A1	23-06-1988 23-01-1986 18-09-1990 29-01-1986 16-01-1988 22-01-1986 29-01-1986 26-11-1986 20-11-1996 24-02-1986 22-01-1986 01-03-1988 26-03-1988 16-09-1987
GB 2308315	Α	25-06-1997	NONE		
WO 9924144	Α	20-05-1999	GB WO NO	2346817 A ,B 9924144 A1 20002402 A	23-08-2000 20-05-1999 07-07-2000
US 5927511	Α	27-07-1999	AU CA EP WO	4000499 A 2332539 A1 1098688 A1 0000264 A1	17-01-2000 06-01-2000 16-05-2001 06-01-2000
US 4696751	Α	29-09-1987	GB	2194167 A ,B	02-03-1988